than normal, this discrepancy might have been absent. Infants and young children with pneumonia are marked exceptions having frequently pulses of 110 to 130 with blood pressures of 80 to 100 which minus one fraction does not in the least invalidate an excellent prognosis. This is not unexpected when we consider that healthy infants normally have a pulse of 90 to 115 with a blood pressure of 80 or thereabouts making a quotient of less than one. In the adult, the quotient (normally) is about 1.6. Gibson's rule, in adults at least, seemed to be of very considerable aid in prognosis and indication for treatment.

1. Citations taken from Osler's Modern Medicine, 1st edition, vol. ii, pages 570-571.
2. Citations after Lambert q. v.
3. Lambert, A. The Blood Pressure in Pneumonia. Journal Am. Med. Ass'n, vol. lvii, No. 23, Dec. 2, 1911.

SPECIAL FACTORS CONCERNING SURGERY OF CANCER OF THE LIP AND TONGUE.*

By H. A. L. RYFKOGEL, M. D., San Francisco.

In recent years physicians and sanitarians have been devoting great attention to educating the laity in the prevention and methods of cure of tuberculosis, and as a result of their efforts the disease has been steadily decreasing, and when patients are infected they, as a rule, no longer put obstacles in the way of a rational treatment.

Not so is it with cancer. This disease has but little if any attention paid to it by those interested in preventive medicine, and yet, while it is to a great extent preventable, it is steadily increasing. Thus Williams claims that in England, the rise is 3% to 5% per year. An extreme example is that of the little town of Fillingsboro in Sweden, where the deaths from cancer increased from 2.10 per 100,000 living in 1800 to 118 per 100,000 living in 1900. The Scottish widow's life insurance fund of Edinborough showed .93% of its deaths due to cancer in 1815 and 6.88% in 1894, or 600% increase in 76 years. The Aetna Life Insurance Co. in 1870 showed 2.6% of its deaths due to cancer, in 1906—7.3%, or nearly 200% increase in 36 years. San Francisco shows the highest death rate from cancer of any city in this country, or 125 per 100,000 living.

Until the ultimate cause of carcinoma and with it a medical cure for cancer is discovered, we must combat the disease by removing through medical and surgical means precancerous conditions, such as chronic ulcers, pigmented moles, benign tumors, areas of chronic inflammation, etc., and do away with sources of irritation, like jagged teeth, gall-stones and others too numerous to mention, and finally when the disease has developed, by removing it by efficient surgical means.

THE ETIOLOGY.

Cancer of the tongue and lip is frequently brought on by the irritation of tobacco smoke, and for this reason is much more frequently seen in men than in women. Therefore a striking proof of the causative role of chronic irritation is the frequency of cancer of the mouth in the women of Ceylon, who chew a mixture of betel nut leaves and lime. Cancer frequently develops at the point where a jagged tooth is constantly scraping a mucous membrane, and one not infrequently sees a cancer forming a socket as it were, for the offender. The role of syphilis in the causation of carcinoma is but an indirect one, in that it produces fissures, ulcers and thickened areas that after long duration and irritation by infectious agencies, irritating food or tobacco, form a point or area in which cancer readily begins. Areas of leukoplakia frequently undergo cancerous degeneration and warts on the tongue practically always are or soon become carcinomatous.

PATHOLOGY.

Omitting the cylindrical celled cancers of the tongue and lip, which are exceedingly rare, we have two types of epithelioma, the baso-cellular and the plano-cellular, the latter of which is the more frequent as well as the more malignant. Cancers of the tongue spread more rapidly by contiguity and by embolus than those of any other portion of the body, because the muscles of the tongue being just below the mucous membrane are easily infiltrated and by constant motion disseminate the cells and force them into lymphatic channels. Two years is the limit of life of a patient thus afflicted, if he does not receive surgical aid. Death has occurred as early as seven months from the time a lesion was noticed. Cancers of the lip are of much slower process.

Epitheliomata of the lip and tongue, although they early set free cells which infect the cervical glands but rarely get beyond the cervical lymphatic collar and form general metastases.

DIAGNOSIS.

The early diagnosis of cancer gives the greatest promise of successful surgical relief and I would urgently impress upon you that the so-called classical symptoms of cancer, cachexia, enlarged glands, and lancinating pains, are evidence not only of the disease but of the onset of the period when the duties of the surgeon cease and those of the priest and undertaker begin. One should always suspect carcinoma when there appears any persistent induration either as a localized chancre-like thickening or a stiffening of the base of a simple ulcer.

Changes in leukoplakic areas suggesting infiltration of the tissue below are very significant and warts on the tongue must always be considered potentially or actually malignant. The ulcerations of syphilis are more apt to be multiple and when of the secondary type are accompanied by other evidences of the disease. The tertiary ulcer is usually on the dorsum while cancer attacks the side; the tertiary ulcer is not as a rule painful, it shows little tendency to heal and its base shows a tough leathery slough; the carcinomatous ulcer, on the contrary, is painful, bleeds readily and has a soft, friable base.

Against two diagnostic methods would I particularly warn, namely: iodide of potash and mer-

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cury, and removal of small pieces for microscopic examination. Cancerous ulcers frequently improve temporarily under the iodides, particularly when associated with the mouth washes always ordered at the same time. Mercury is very apt to cause ptyalism, and in the presence of this complication, operations on the tongue become very much more dangerous. The removal of the growth and its examination by a competent pathologist is the only diagnostic procedure worthy of the name. The whole diseased area should be removed and handed to the expert who should make an immediate examination while the patient is still under the anesthetic, and if the removed tissue be malignant, the radical operation should be immediately proceeded with. Any other course is apt to cause a rapid dissemination of cancer cells.

Dentists should be trained to recognize precancerous and cancerous conditions, because in many instances they will have the first opportunity to note them.

ANATOMY.

The tongue anterior to the circumvallate papillae is supplied with a rich network of lymphatics which converge to form numerous trunks, which following the general course of the lingual blood vessels empty some into the lingual and submaxillary lymph glands and others directly into the deep cervical. One trunk passes down the omohyoid muscle to empty into a gland situated at the lower end of the internal jugular vein. The lymphatics of that portion of the tongue posterior to the circumvallate papillae are almost entirely separated from those in front and converge to two trunks on each side which pass back of the tonsil and through the pharyngeal wall to the upper deep cervical glands.

Although an injection mass can be forced from one side of the anterior tongue to the other, the anastomoses between the two areas is very scanty and cancer but rarely passes from one side to another or from the anterior portion to the base, except as the result of growth by continuity. The lymphatics of the lip all drain into the submental and submaxillary lymph gland which empty into the external jugular and upper internal deep cervical.

Lymphatic glands. The cervical glands to be considered in cancer of the tongue and lip are: the lingual or submental, the submaxillary, the external jugular, the upper deep cervical and the lower deep cervical.

The lingual lie upon the myohyoid and between the geno-hyo-glossi. Two of these known as the submental are particularly liable to be overlooked in operations on the lip. The submaxillary glands lie beneath the deep fascia upon the capsule of the salivary gland and for their easy and certain removal it is necessary to take away this structure. The external jugular group (2-6 in number) lie along the external jugular vein to its middle on the surface of the deep fascia. Some vessels from the submaxillary glands empty into them. The upper deep cervical are those deep glands above the omohyoid muscle and are divided into an outer and inner group, the inner lie behind the sterno-mastoid, some being attached to the posterior layer of its sheath, and around the internal jugular vein and carotid arteries. They are large and receive the greater part of the lymph from the tongue, partly directly and partly through the submaxillary and lingual glands. They receive all the lymph from the lip through the above glands. The external upper deep group are small and lie in a continuous chain back of the sterno-mastoid. They need only be removed in advanced cases, in which event it is necessary to resect with them the sterno-mastoid muscle.

The lower deep cervical glands lie below the omohyoid draining the upper deep cervical and receiving one lymph vessel directly from the tongue.

It is necessary, therefore, always to remove them in cancer of the tongue, but only in advanced case of cancer of the lip, i. e. when the upper deep glands are evidently involved.

OPERATION.

If it were possible always to make a complete block operation in these cancers of the mouth, our results would be very satisfactory indeed, because the cervical lymphatic collar acts as a barrier so that general metastases very rarely occur. Unfortunately if the buccal secretion gain access to the extensive raw areas left by the necessary dissection, dangerous infection and sloughing are liable to occur. Fortunately the cells in cancer of the tongue and lip pass to the lymph gland by embolism and not by continuous growth, as in cancer of the breast, and one can perform an operation in two stages with a fair though not absolute degree of assurance that the lymph channels between the original growth and the block do not contain cancer cells.

Which shall we remove first, the original growth or the glands? If we remove the glands we take away that part of the disease which is growing most rapidly and we cut off the blood supply of the neoplasm, thereby temporarily inhibiting its growth and sometimes even causing a diminution in size and converting in the case of the tongue, an otherwise difficult and bloody operation into a very simple and comparatively bloodless one. The patient, moreover, still has his cancer and gives no objection to the second operation, whereas if the tongue has been removed first, he frequently does so.

The objection to doing the gland removal first is that the primary growth is still present and may feed more cells into the lymphatic channels to be overlooked at the next stage.

It is probable that this objection is not important if the vessels have been tied at the first stage.

In cancer of the lip when bringing flaps from the neck as described below, it may be necessary in order to maintain nutrition in the flaps, to do the lip plastic as the primary stage.

These operations are extensive and frequently done on the old and debilitated, and it is therefore necessary to use precautions to lessen hemorrhage and banish shock-producing factors. The patient should, therefore, during the operation, be

in the sitting position, partly to lessen hemorrhage and partly by anemia of the brain to lessen the amount of anesthetic required.

In order to remove the injurious action of fear upon the nerve cells, the patient should have had sleep induced the night before by veronal and brought to the neutral state described by Crile by an injection of morphine and scopolamine, one-half hour before the operation. The action of surgical shocks, such as sponging and tearing, should be reduced to a minimum by gentle handling and by blocking the lingual, dental and superficial cervical nerves by injection of novocain-adrenalin solution. The mouth should be carefully attended to, of course, for some days prior to the operation.

In cancer of the lip, the submental, submaxillary, external jugular and upper cervical glands of both sides must be removed.

If the upper cervical are macroscopically affected, the lower cervical must be removed also. Sometimes this must be done in two stages, making with the lip plastic three stages. In cancer of the tongue usually it is necessary to remove the glands only on the side affected; if the growth approach the median line or has deeply infiltrated the lingual muscle, or if glands on the opposite side are palpable, it is necessary to do a block dissection on both sides.

In cancer of the tongue it is necessary to carry the dissection from back of the clavicle to the styloid process above the digastric muscle. The incision for the complete radical gland dissection should extend from the sterno-clavicular notch to the mastoid process to meet another running from the mastoid process to the middle line or other mastoid process, as above indicated, one-half inch below the jaw.

The skin is dissected back in all directions and the deep fascia and fat containing the external jugular gland and vein is dissected off the surface of the sterno mastoid muscle which is retracted backward and separated from its sheath, which is cut through posteriorly, avoiding the 11th nerve. This mass of fascia and fat, to which are adherent many of the deep cervical glands, is dissected off the scalenius anticus and medius muscles, internal jugular vein and carotid arteries. The deep fascia is now dissected off the lower jaw to which it is strongly attached and off the parotid gland, the lower part of which cut through to catch those glands attached to it. The parotid gland is now lifted up and retracted, the facial nerve being protected by the blade of the retractor, the gland and fat above the digastric are dissected off the stylo maxillary ligament, the stylo pharyngeus muscle and pharynx.

If the case is at all advanced, it is wise to remove the digastric and stylohyoid muscles, the hypoglossal nerve and external carotid artery. If any glands are adherent to the jugular vein it should be sacrificed and ligated as closely as possible to the base of the skull. The pneumo-gastric nerve on one side under exceptional circumstances can be removed without great danger. The submaxillary gland is now pulled down and cut away from its attachments above; if one desires to dissect the posterior triangle, the sterno mastoid muscle should be removed in the block.

Drainage should be established through separate small incisions, using gutta percha tissue or silk worm gut rope.

I will not discuss the removal of the tongue beyond suggesting that tubage of the pharynx as suggested by Crile be used. I have found this trick to very greatly simplify this and other operations about the mouth.

I would also remind you that on account of the peculiar lymphatic supply of the tongue if the anterior part be invaded we can safely leave the base and if early, we can split the organ and leave the uninvaded half.

SALVARSAN IN CUTANEOUS SYPHILIS.*

By HOWARD MORROW, M. D., San Francisco.

Since December, a year ago, nearly all our salvarsan injections have been given intravenously. A few intramuscular injections of salvarsan in iodipin were given, but this method was found as painful and unsatisfactory as the original suspension for subcutaneous use. The greatest number of injections given to one person, was in the case of malignant syphilis, reported before this society last December. This man had two subcutaneous and two intravenous injections. His last injection was given in May, 1911. Since then he has had no symptoms of lues and his Wassermann reaction has remained negative.

The following cases will be reported briefly to demonstrate the various forms of syphilis suitable for treatment with salvarsan.

Mr. S., aged 42. Chancre of upper lip in July, 1908. This would not disappear under mercury given by inunctions and injections. Subjective symptoms were unusually severe. There was some improvement under arsacetin. Later, he had recurrent mucous patches on palate, cheeks and lips. These continued, notwithstanding specific treatment until January, 1911, at which time he was given .5 gms. of salvarsan intravenously. He was seen in November, ten months after the injection, and during that time he has been absolutely free of symptoms and his general health has greatly improved.

L. L., aged 11. Extensive ulcerations of soft palate and posterior wall of pharynx, and gumma of hard palate with perforation. Duration many years. Diagnosis: Hereditary lues. Ulcerations would partly heal under mercury, but new lesions would develop. She was given one injection of salvarsan intramuscularly, and two injections intravenously. The last was given in June, 1911. Since then the naso-pharnyx has remained healed, but the Wassermann reaction is still positive.

Miss B., aged 20, with generalized lenticulopapular and miliary papular syphilis, was injected with salvarsan in June of this year. Two weeks later there was very little change in the appearance of the eruption, so another salvarsan injection was given. After this second injection the eruption began to fade, but became stationary in two weeks. Since then the patient has received weekly injections of salicylate of mercury, and although clinical symptoms have disappeared, the Wassermann reaction is still positive.

Mr. C., 30 years of age, had his initial sclerosis in May, 1908. Vigorous treatment with mercury

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